Methodology

To maintain compliance with the National Pollution Discharge Elimination System (NPDES) requirements, the Arizona Department of Transportation is updating maps of the storm sewer drainage system in metropolitan Phoenix and Tucson, as well as statewide municipalities identified for Phase II. The Arizona Department of Environmental Quality now has regulatory primacy, and the NPDES compliance is now referred to as Arizona Pollution Discharge Elimination System (AZPDES). These maps include a schematic depiction of all pipes and culverts with a diameter of 36 inches or greater, as well as channels with conveyance capacities equivalent to a 36" pipe or greater. Additionally, all storm water outfalls to Waters of the U.S. are identified, mapped, and photographed. This map update builds on work completed in 1991 for the initial Phase I Permit Application, and the 2003 Phase I update. This submission includes the hard-copy maps in this report as well as digital graphic files for reproducing these maps and the underlying GIS digital data used to produce the maps. A description of the methodology used to produce these maps follows.

The mapping update includes two components, the underlying GIS data used to produce the maps and raster graphic pdf files used to produce the hard copy maps. It should be noted that the depiction of the system is schematic in nature. The pdf files were designed for and constructed on a "D" size sheet (22" x 34") at a scale of 1" = 2,000' and those files accompany this report. However, they were intended for printing half-size sheets (11" x 17" at a scale of 1" = 4,000") easily reproduced by those without oversized copying devices. At this scale, drainage infrastructure placed in spatially correct locations would be undistinguishable from the highway infrastructure on the hard copy maps. The displacement of the storm drainage system has been exaggerated for easy viewing at a scale of 1" = 4,000'.

The detail maps of the storm drainage system accompanying the 1991 Phase I Permit Application utilized USGS 7.5' topographical maps as their base. The information on these maps does not exist in digital form and had to be digitized from the originals. The mapping produced for this update was digitized from the original maps in ArcView GIS. The original 1991 detail maps used the extents of the 7.5' minute quadrangles (i.e., Sheet 9 was displayed over the Tempe quad). While the current mapping effort maintained the 1:24,000 scale on a 22" x 34" sheet, the sheet extents were arranged to minimize the number of sheets required for this report, and portions of four USGS quadrangles are found on each of these detail sheets.

Using Digital Raster Graphic (DRG) files of the topographical quadrangles as the base reference, the data from the original maps was first transferred from hard copy to GIS shape file format. Because the DRG files were in UTM rather than the State Plane coordinates used by ADOT, the maps were generated in UTM Zone 12 NAD 83 datum (meters), then converted to Arizona Central NAD 83 datum (feet) for the digital submission of the GIS data. The actual hard copy maps produced for this report use ADOT's GIS base data (highways, hydrology, local roads, municipal boundaries, etc) for depiction. Maricopa County and Pima County Flood Control Districts supplied the floodplain data depicted on the maps.

Numerous portions of the compliance area contain freeway segments built during the interval between the initial permit and this update. For depicting the new storm drainage system elements on these new highway segments, roadway "as-built" design plans were examined for pipes, channels, culverts, and outfalls. These features were then added to the depiction of the existing system.

With the initial data conversion complete, field visits to each of the outfalls were conducted to ensure the correct locations and acquire digital images of the physical features present at each location. A Garmin e-trex hand held GPS was used to gather coordinate information for the actual location of each outfall rather than the schematic depiction shown on the hard-copy maps. The accuracy of these GPS devices is +/- 30 feet. Therefore, data in the outfall table has been rounded to the nearest fifty feet.

In some instances, the Storm Drain features do not include attribution on the maps or in the GIS database. Considerable care has been spent in gathering and depicting available storm drain information. However, in some circumstances, dimensions of portions of the infrastructure were not clear or not labeled on the As-Built Plans. Linear, point, or aerial features in these case are visually depicted but do not include attribution. Overall, no limitation diminishes the intent and requirement of compliance, the mapping of the system required in the AZPDES guideline